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A BRIEF STUDY OF THE CONTRIBUTION OF IGNAZ PHILIP SEMMELWEIS TO MODERN MEDICINE

BY

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A BRIEF STUDY OF THE CONTRIBUTION OF IGNAZ PHILIP SEMMELWEIS TO MODERN MEDICINE.*

By RICHARD COLE NEWTON, M.D.,

MONTCLAIR, N. J.,

CONSULTING PHYSICIAN TO THE MOUNTAINSIDE HOSPITAL.

Ignaz Philip Semmelweis was born in Budapest, Hungary, in July, 1818, and died in Vienna in August, 1865.

His father was a tradesman in a fair way of business, and his mother came of good, respectable stock. The particulars of his early life do not seem to be well known, nor are they of especial concern to us. He studied medicine at Vienna where he was known as a light-hearted and companionable young man, who, however, was an earnest student, capable of an extraordinary amount of painstaking and laborious effort. He had developed a strong taste for midwifery, and, in 1844, he took the degree of master of midwifery and applied for the position of assistant to the Clinic for Obstetrics attached to the Vienna General Hospital. This was an important position and its occupancy was esteemed a great advance for a young man, and an indication that he would achieve substantial honors in the obstetrical world.

Owing to the fact that his predecessor in this post had obtained a two years' extension of the

*Read before the Orange Mountain Medical Society.

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regular tour of duty, Semmelweis was obliged to wait from 1844 to 1846 for his chance to fill the position. During these two years he made good use of his time by studying in the clinic—this he could do quite advantageously while not tied down by the routine duties of a regular assistant. Although he could not spare the time for regular attendance at the Gynecological Clinic he devoted himself with considerable assiduity to the pathological study of the bodies of the women who had died from gynecological diseases and operations. Owing to the friendship which Professor Rokitansky entertained for the young man, Semmelweis was afforded abundant opportunity for study upon the cadaver, of which he made good use.

In 1846, Semmelweis obtained the regular appointment as clinical assistant in the first obstetric clinic. There were two clinics; the first for the instruction of medical students, and the second for the instruction of midwives. The assistant in the first clinic had to visit and examine every patient in the early morning so that he might report on each case to the professor, upon the arrival of the latter in the wards, later in the day. The assistant on these rounds was accompanied by a crowd of students, each one of whom might examine any or all of the patients. As Sinclair sententiously remarks, "here we have a glimpse of practices which may well make the modern accoucheur shudder." In the afternoon it was the duty of the assistant to take the students through the wards again for the purpose of clinical instruction and to reexamine every patient who was in labor.

Not satisfied with the performance of his prescribed duties, as outlined above, Semmelweis continued his researches into pathological anatomy in the pathological institute during the early morning hours before visiting his patients. This he did chiefly to perfect his knowledge of the pathology of gynecology and obstetrics. He was a most assiduous worker in pathology and, as he afterwards stated, had by the practices just recounted unwittingly consigned many an unfortunate woman to an untimely grave.

During the year 1846 there were 460 deaths in the first clinic and 105 in the second from puerperal fever alone, in spite of all the then known treatment in midwifery practice.

Other young obstetricians, the predecessors and contemporaries of Semmelweis, were aware of these facts, yet seemed to regard them with indifference. In the spare time which they enjoyed between professional work and social engagements they discussed, like the surgeons of our own day, small variations in operations and modifications of instruments, more or less trifling, or the introduction of new therapeutic maneuvers, but Semmelweis took little interest in such discussions.

It was under such circumstances that his immediate successor, Carl Braun, invented his blunt decapitation hook and other clinical assistants made contributions to the technique of obstetric practice which have since been forgotten. Semmelweis had been cast in quite a different mold from his colleagues. He could not accept verbiage for reality, nor amuse himself with toys. His heart bled for the sufferers he saw sicken and die daily while under his care. The constantly recurring questions before his mind were: What is puerperal fever? How does it arise? What can be done to prevent it? What treatment can prevail against it? With the kindly sympathies of a strong man and the tender heart of a woman he "was to exhibit in due course the most cutting indignation and sarcastic contempt for those students and nurses who by their levity and carelessness endangered the lives of the poor women" who were consigned to their care.

In order to be able to appreciate, at least in part, the enormous progress which this man made in unraveling the mystery which had hitherto shrouded the etiology of puerperal fever, it is necessary to consider briefly the various theories which had been advanced in the long course of years to account for its prevalence and mortality.

While it will be impracticable to even mention all of the almost innumerable theories which had been brought forward from time to time, a short reference to some of the more generally accepted will serve to show something of the attitude of the medical mind in the early part of the last century, and also can scarcely fail to be of some historical interest.

Furthermore, as intimated above, only by this means can the enormous debt which the world owes to Semmelweis be even partly appreciated. A case that occurred under the care of Dr. Johann Chiari while Semmelweis was studying for the degree of master of midwifery, and which he had the opportunity of observing, serves to illustrate the simple faith of that day in the supposed terrible power of epidemic puerperal fever. It also casts a strong side light upon the then prevalent methods of practicing gynecology.

A woman suffering from a fibroid polypus of the uterus was admitted to the clinic and the tumor was removed in the usual way. The patient soon showed the symptoms usually noted in puerperal fever and shortly afterwards died. Post-mortem examination revealed lesions identical with those commonly found in puerperal fever. Dr. Chiari explained this state of things by declaring that the patient had actually died from puerperal fever, although she had not been pregnant, nor passed through the puerperium, because, as he alleged, the epidemic influence of the fever had become so strong that it had even attacked and carried off non-puerperal women. This, he explained, might happen in cases where the epidemic influences were exceptionally virulent. A marked instance one might say of an explanation which does not explain. The sort of talk which the casuists in medicine have been wont to employ, and still do sometimes employ, as a cloak to their ignorance.

Sinclair, from whose "Life of Semmelweis" I have been freely quoting, tells us that two principal theories of the etiology of puerperal fever were strongly prevalent up to at least the end of the first third of the nineteenth century. According to one of them the disease was a "milk fever," Without having been able to lay my hand upon a succinct statement of exactly what was meant by the term "milk fever"—a term apparently almost as common amongst physicians seventy-five or eighty years ago as the term autointoxication is among us to-day—I think that I am justified in defining it as a fever which every lying-in woman suffered from when her milk "came." As in those filthy days probably every woman had some infection and showed some fibrile rise when lactation was established, no doubt the fever was looked upon as a necessary accompaniment of the process, and in cases where the fever, instead of subsiding in a few days, increased in virulence and intensity, along with the development of lymphangitis, adenitis, pleurisy, peritonitis, and so forth, accompanied by fibrinous exudates and mitastases, and finally leading to death; the fever which was known to have started when the process of lactation should have begun seemed to have been caused by some pathological change in the milk itself or some derangement of the process.

This assumption would naturally be strengthened by the disappearance of milk from the breasts and the suppression of lactation so generally noted in puerperal fever. The learned men of those days talked about milk pneumonia, milk peritonitis, and so on, evidently believing that the disease producing milk had found its way into the lungs or into the abdominal cavity. One French observer asserted that he had found milk in its natural form inside the peritoneum.

This theory had many supporters in England, and that is probably why it was adopted by Böer, afterwards the professor of obstetrics in the Vienna School of Medicine, and the predecessor of Kline, under whom Semmelweis served in the obstetric clinic. Böer, it should be stated, had studied in England where obstetrics were somewhat better taught, it seems, than in Continental Europe, and had carried the English ideas to Vienna and taught them there. At all events Semmelweis, when he became assistant to the First Obstetric Clinic in Vienna, was what was called a "milk fever epidemicist," which seems to me to mean that he believed that some epidemic influence interfered with, prevented, or altered the secretion of the milk in parturient women, and changed this innocuous fluid into a most deadly systemic poison.

The other common theory of the cause of child-bed fever was that it came from the suppression of the lochia. Smellie, the well-known English obstetrician, was an advocate of this theory, and had probably brought his opinions from France, where they were taught in the School of Mauriceau, whose influence as a teacher spread this doctrine over Western Europe.

The so-called physiological school, as Sinclair tersely remarks, *a lucus a non lucendo*, held to a mixture of these two luminous theories, which were really, it seems, much alike in so far as they explained the fever by attributing it to the alteration or suppression of a natural bodily function.

The so-called gastric bilious fever theory had a considerable vogue in England at one time. The severe cases of puerperal fever were also called putrid fever. Arising apparently at about the same time and holding its ground for about a century was the assumption that inflammation was the central fact in child-bed fever. The advocates of this doctrine naturally divided themselves into cliques accordingly as they followed the teachings of different individuals who claimed that the trouble might start in one or another of the organs of the body, which might be the peritoneum, or the womb, or the intestines, or even the omentum. William Hunter and, later, Baudelocque, were perhaps the most prominent and influential advocates of the theory of a primary peritonitis as the cause of puerperal fever.

About the middle of the eighteenth century we find the first reference to erysipelas as closely associated with child-bed fever. Gordon of Aberdeen (1795) alleged that puerperal fever was an erysipelas of the bowels and peritoneum. By the middle of the nineteenth century the almost universal belief in England and America was that erysipelas and puerperal fever were identical maladies.

Another doctrine was maintaned more or less strenuously during this time, which was apparently at variance with the theory of the intimate relationship between erysipelas and child-bed fever. This maintained that the latter was really a disease *sui generis,* independent as an entity, but most variable in its phenomena, owing to fortuitous influences. This belief still prevailed in England, even when it was assumed that any zymotic disease was capable of taking on the form of puerperal fever while concealing its own most characteristic features. As for example, scarlet fever, without its rash and without its angina, was supposed to seize the lying-in woman in the form of child-bed fever. "Nulla febris est quæ non alquando cadat in puerperam." (There is no kind of fever which does not sometimes attack the lying-in woman.)

This pathological hodge-podge was called the "variable" theory of puerperal fever as enunciated by Eisemann in 1837. No doubt my esteemed colleague on this historical committee, my old friend Dr. Harvey, recollects as I do similar theories of the etiology of puerperal fever which were still taught and believed when we were students.

Ultimately came the dawn of the wound-fever theory as the internal factor in the causation of this disease. Yet even in England, where the most rational pioneer opinions had developed, there were for years and very likely still are vestiges of a general belief in a *contagium,* and the pioneers of our modern pathology harked back to a "specific something" an "unknown something," the *divinum aliquid,* perhaps a specific primary change in the blood, which was alleged to produce the local lesions.

During those long years when these chaotic ideas prevailed regarding the internal factors in the etiology of puerperal fever, the explanation of the external factors was still more vague and incomprehensible. Certain more or less clearly defined influences of an atmospheric, telluric, or cosmic nature were alleged as causes of the disease. To them the term *genius epidemicus* was applied, and so evanescent were they alleged to be that mere changes in the weather were constantly referred to by some writers, especially German, French, and even Scotch authors, as sufficient to account for the greater or less prevalence of child-bed sickness. A specially injurious entity, more fearsome by reason of its mysterious origin, was alleged to be developed and spread abroad in some unknown way. It was called a miasma. This miasma, or *genius epidemicus,* might extend over a vast area, or it might be restricted to a single town, or even a single building, such as a hospital, where it was especially prone to develop if there was overcrowding of pregnant or puerperal women—the so-called "crowd poisoning" of our ancestors. This was the theory to which Cruveilhier lent the weight of his powerful authority.

It was believed by many that with a certain intensity and extension of the malady a contagion was brought into existence. According to this belief a contagion represented a specific virus which originated only in the diseased organism and that from that point of origin could produce in another individual the same disease. In some minds the contagion assumed the form of a mysterious halo, or areola, which clung to the unfortunate practitioner who had come under its malign influence and rendered him a source of danger wherever he went. Coming near to the time when the doctrine of Semmelweis was announced we find an almost general prevalence of the belief that the pregnant and puerperal woman was a thing unique in nature. This theory of loaded blood and tissues generally, this state of unstable equilibrium when the system was hanging on the verge of fever and was especially vulnerable to the influence of any adverse factor, held the field for years, especially among the "older, unteachable, obstetric mandarins of England." Yet it had to give way finally before the advance of modern thought and was the last barrier to the spread of the present doctrine of the pathology of child-bed fever.

It will take us too far afield to describe the doctrines of blood crasis and hyperinosis, which seem to have been lugged into this hypothetical pathology to explain why the pregnant and parturient female was assumed to be a being governed by supposititious laws which had no application to any other living creature. We still find Virchow in 1861 and Barnes in 1875 teaching the spontaneous origin of child-bed fever. My venerable colleague and I can still remember the talk about the *locus minoris resistentiæ* and the malign effects of sudden emotions, indiscretions in diet, and changes in the weather upon lying-in women. Is it to be wondered at, then, that when Semmelweis made his great discovery he found, like Copernicus and Galileo, a wall of prejudice and human vanity directly in his path, which made his progress exceedingly difficult?

To return to the personal history of the subject of this paper we find Semmelweis, in 1846, duly installed as assistant to the Chair of Obstetrics and in charge of the First Obstetric Clinic in the Vienna General Hospital. He had observed that there were between three and four times as many deaths in child-bed in the first clinic as in the second, and he also reflected that students fresh from the operating room and the dead house freely examined the patients in the first clinic, while the midwives, who had no such free access to cadaveric material, handled and delivered the patients in the second clinic. He also observed that it was especially the young and vigorous primiparæ, often powerfully built and strong young women, whose first labors were naturally tedious, who were most apt to suffer from the dreaded child-bed fever.

So marked had the difference in the mortality records of the two clinics become, that the patients themselves were aware of the dangers of being delivered in the first clinic, and begged and prayed with tears and lamentations not to be sent into its wards. Still the rule of sending every other patient into the first clinic and the alternates into the second was maintained. Except in the medical attendance there seemed to be no difference whatever in the surroundings, appointments, and management of the two clinics.

Semmelweis had noted all these things, but their true significance had not yet dawned upon him. In 1847 (March 20) Professor Kolletschka, whom Semmelweis especially honored and esteemed, received a prick of the finger in making an autopsy. He thereupon became afflicted with lymphangitis of the arm, followed by pleurisy, pericarditis, peritonitis, and meningitis, from which he died in a few days after the initial infection. Shortly before his death a metastasis occurred in one of his eyes. The autopsy revealed a series of lesions identical with those found after death from child-bed fever. As Semmelweis says, "Excited as I then was, it entered into my mind with irresistible clearness that the disease from which Kolletschka had died was identical with that from which I had seen so many lying-in women die." This instance, with its powerful shock to his feelings, broke upon Semmelweis like a revelation and led him to his great and immortal discovery. The difference in the mortality rates of the first and second obstetric clinics was explained. It was because the students without sufficiently cleansing their hands after handling cadaveric material examined the lying-in women in the first clinic, while those in the second were not exposed to this source of infection. It also explained why the young and strong primiparæ were more prone to child-bed fevers in the first clinic than the multiparæ, simply because being in labor longer they were examined more times and by more students than those whose labors were shorter and less interesting. Semmelweis immediately ordered that every student before examining a woman in the lying-in wards should wash his hands thoroughly in chlorine water. As a result the mortality of parturient women in the first clinic fell from 12 per cent. to 3 per cent. in the course of two months.

In the month of March, 1848, the students and professors, including Clinical Assistant Semmelweis, were busy with the military affairs of the revolution, and the deliveries in the first clinic were left almost entirely to chance and the care of the head midwife. Under this policy of non-interference not a single death occurred in that month. During eight months of the previous year the mortality rate was as follows: In April and May of every 100 parturient women over 18 died, while in the following six months, after the careful washing of the hands of the students and professors with chlorine water had been enjoined, out of every 100 parturitions only 2.45 women died.

Semmelweis had promulgated the following assertions: "Puerperal fever must always be considered as a fever due to the absorption of decomposed animal, organic matter. This absorption may result from *auto*-infection (the product of infection coming from the individual herself) or from *hereto-infection* (the product of decomposition coming from without). Consequently not only the cadavers of every age and of every sex, when they are in a state of decomposition, but also the sick of every age and of every sex whose disease is accompanied by the decomposition of organic, animal matter, and, furthermore, every animal, organic tissue which presents a certain degree of decomposition—every one of these may be the starting point of puerperal fever."

This is unquestionably sound pathological doctrine. Had Semmelweis only had some knowledge of bacteriology his name would have been bracketed with those of Lord Lister and Pasteur. However, he deserves far more recognition for what he did than he has so far ever received, and doubtless time, which makes all things equal, will do justice to the reputation of a great and unselfish benefactor of the human race. Like all promulgators of a new and startling truth, he met with but scant appreciation when he first announced his discovery, and he had the misfortune to excite the enmity of his superior, Professor Kline, who had little sympathy for reformers, or even for investigators of any sort. This latter functionary prevented Semmelweis from obtaining a reappointment for two years as assistant to the Obstetric Clinic, a privilege which had been granted to his predecessor.

With the help of his satellites and the court favorites, both men and women, who had far too much influence at that time in medical affairs in Vienna, Kline proceeded to make Semmelweis' life in Vienna as intolerable as possible. They denied his assertions that by his method of prophylaxis the mortality rate in the Obstetric Clinic had been reduced fourfold, and when Semmelweis demanded access to the hospital records in proof of his statements they forbade him the use of the records.

Semmelweis then applied for the position of privat docent in obstetrics. After some vexatious delays this was granted him, but with certain humiliating conditions, probably intended to cause him to decline the position. When certain of Semmelweis's friends demanded the appointment of a commission to investigate the claims which he had made, the court party succeeded in preventing the investigation and began a counter attack upon Skoda, Semmelweis's principal champion, alleging that he entertained "materialistic opinions," whatever that may have meant. This contest waxed exceeding warm and the laity and the clergy, then as now quite ready to mix up in a quarrel, the bearings of which they could not comprehend, took a full part in the proceedings.

Semmelweis, whose native modesty had for a long time prevented him from accepting the invitation of the Vienna Medical Society to expound his views before them, finally apparently stung into action by the persecution to which he had been subjected, came before the society and set forth his claims with the proofs. He was exceedingly well received and was elected a member of the society. This was in 1850. Yet this partial triumph seemed to redouble the efforts of his enemies to drive him out of Vienna. Finally he yielded to the pressure, suddenly going back to his native town, Budapest, in Hungary.

So far as the advancement of his doctrine and the establishment of the truth of his great and beneficent discovery was concerned, his retreat from Vienna without even bidding his friends good-bye, was a bad move, as by so doing he alienated some excellent and powerful friends, including Skoda, whose energy and fearlessness had enabled him to triumph over the same stupid and malicious coterie that was persecuting Semmelweis. The sudden departure of the latter from the field of battle also gave the reactionaries an opportunity to say that there was nothing in his claims, or he would have remained at his post to defend them.

Some of the students of his life think that his sudden and ill-judged retreat from Vienna was due to an uncontrollable impulse and was an early manifestation of the mental malady which finally carried him into an insane asylum.

We have no time to follow this interesting man into his new field of labor, where his great learning and industry finally brought him sufficient recognition to secure him the chair of obstetrics in the local hospital, and where his abilities secured him a living practice. He wrote a book setting forth his theory and its proof. The latter part of the work, particularly, is burdened by long and ill-natured tirades against his enemies and those who refused to accept his doctrine, showing a gradual undermining of his crisp and vigorous intellect by the increasing mental alienation.

He gradually became more and more subject to alternating periods of mental exaltation and depression, and finally, in July, 1865, it was found necessary to take him to an insane asylum near Vienna. It was then ascertained that he had a gangrenous wound of one finger which had involved a joint and gradually extended up the arm, producing lymphangitis and adenitis; metastases formed and the disease finally assumed the form of pyopneumothorax, from which he died on August 13, 1865, within a fortnight after having left his home in Budapest.

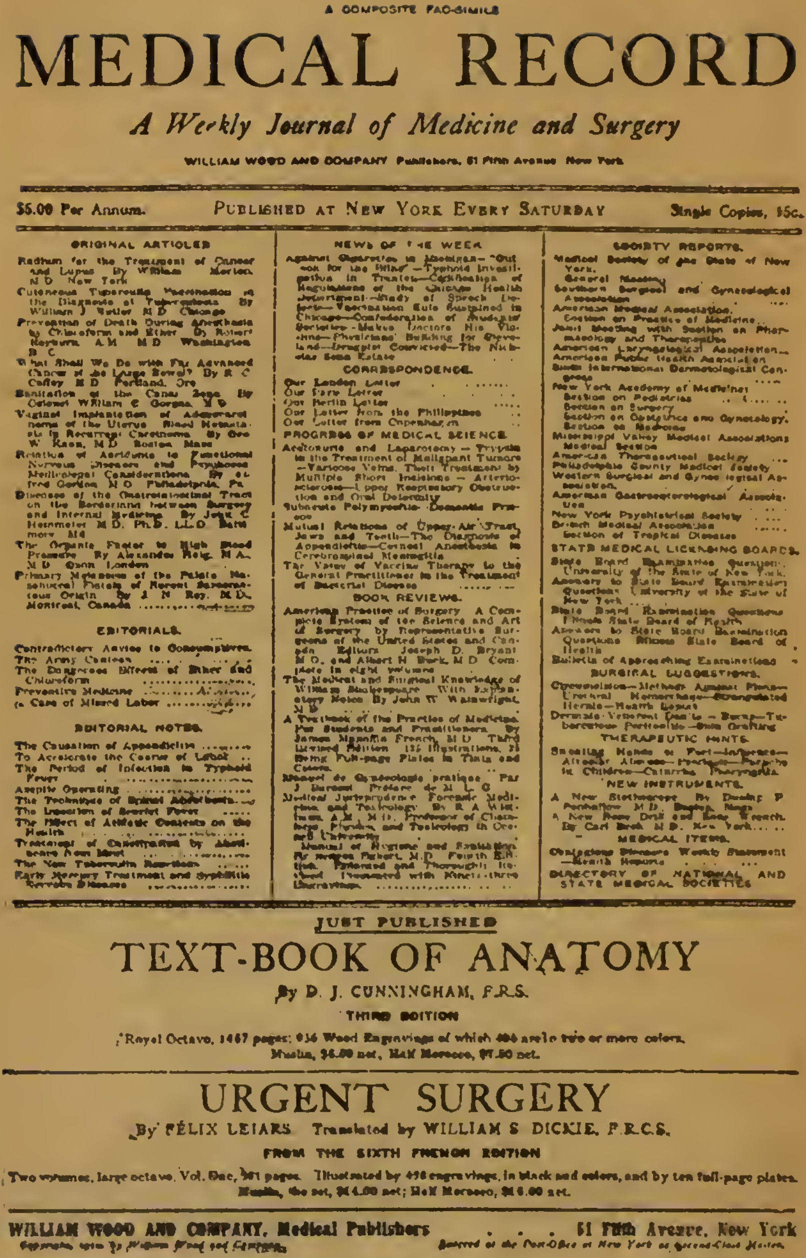
It is a remarkable thing that he died of the disease which he had all his life fought so vigorously and finally succeeded in explaining so clearly. There was quite as much reason really for calling his fatal malady puerperal fever as for saying that the septicemia that carried off the patient of his friend Dr. Chiari in 1844, of which we have already spoken, was puerperal fever. An autopsy revealed the fact that Semmelweis had suffered from chronic degenerative changes in the brain and that those changes had been progressing for a considerable time.

While modern obstetrics and gynecology undoubtedly received their present great advance in antisepsis from surgery, especially from the epoch-making teaching of Lister, it is safe to say that if Semmelweis's teachings had been followed to their logical conclusions they would so far have revolutionized medical thought that surgery would have been indebted to midwifery instead of midwifery being indebted to surgery for the greatest advance ever made in the healing art, viz., asepsis. Curiously enough in this connection we note that in a report of Haller's on the work of the General Hospital in Vienna several pages are devoted to a discussion of Semmelweis's discovery, and the opinion is expressed that its bearing should be of inestimable importance to surgery. This was in the spring of 1849 and was probably the first time in the history of medicine that any suggestion had been made regarding the importance of observing prophylaxis, that is, asepsis, in surgical practice. As might have been expected, the solemn, conventional professors and teachers of surgery in the General Hospital smiled sarcastically at their colleague the *physician* who was so imprudent as to entertain any views upon surgical questions, and they treated his inspired suggestion with the same lofty disdain that Sinclair tells us the "unteachable obstetric mandarins of England" showed toward the first announcement of the great truths underlying the wound theory of the etiology of puerperal fever.

Semmelweis's great discovery was really no inspiration nor a revelation from heaven. It came, as nearly as all good things in science and education have come, to the trained and receptive mind of a faithful and painstaking worker in an especial field after years of study and careful thought. The death of his friend Kolletschka from an autopsy wound revealed the great truth to Semmelweis that the poor women in the first obstetric clinic were really dying of autopsy wounds. Semmelweis's interpretation of this phenomenon was as truly a scientific triumph as Newton's interpretation of the phenomenon of the falling apple. Both phenomena were common enough, yet in both cases it took a scientific intellect trained and directed by years of painstaking research to interpret the underlying causes correctly and thereby confer upon mankind inestimable and eternal benefits.

I cannot close this meager account of a most interesting personage without paying a tribute to his kind and manly heart. Had his pity not been stirred by the unfortunate women condemned to suffering and death while paying to nature the sacred debt of perpetuating their species, probably his great discovery would never have been made.

"Consider," says Carlyle, "how the beginning of all thought worth the name is love, and the wise head never yet was without the generous heart."



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